REMARKS — General

By the above amendment, applicant has amended the specification to correct the typographical errors.

Applicant has also rewritten all claims to define the invention more particularly and distinctly in order to overcome the technical rejections and define the invention patentably over the cited prior art.

The Objection to the Drawings

The drawings are objected to under 37 CFR 1.83(a). The last O.A. stated that the feature that "the predetermined value of said criterion has been met" must be shown or the feature canceled from claim(s). Since the above feature is comprised in claim 15, claim 15 has been canceled.

Accordingly applicant submits that the drawings now comply with 37 CFR 1.83(a).

The Objections to Claims 1, 17, and 25

Claims 1, 17, and 25 are objected to because of the misspelled phase "at lease". Claims 1, 17, and 25 have been amended such that the correct phrase "at least" is used.

Accordingly applicant requests withdrawal of the objections to claims 1, 17, and 25.

Election/Restrictions

The last O.A. requires the restriction to one of the following: (i) claims 1 – 23, 25 – 26, and (ii) claim 24. Applicant elects claims 1 – 23, 25 – 26 and cancels claim 24.

The Rejections of Claims 17 – 21 Are Overcome

The last O.A. rejected claims 17 – 21 under 35 U.S.C. 102(b) as being anticipated by Kutz et al. (On the Performance of A Practical Downlink CDMA Generalized Rake Receiver). Applicant requests reconsideration of the rejections for the following reasons:

(1) Kutz et al. fail to teach, anticipate, suggest or render obvious the novel elements in claim 17. Claim 17 comprises elements (a) – (e). The last O.A. noted that each element in claim

17 was described by Kutz et al. Applicant will describe the novelty of claim 17 by discussing each element in claim 17.

The last O.A. stated that element (a) of claim 17, "estimating at least one composite channel impulse response from said received signal", was described by Kutz et al (page 1355, left column, section IV, 1st 5 lines). The novelty of element (a) in claim 17 is the estimation of the composite channel impulse response (CIR). Composite CIR is defined on page 4 of the specification, where the disadvantages of the G-rake receiver are discussed. For channel estimation, G-rake estimates the locations, amplitudes and phases of individual fingers, as opposed to estimating the composite CIR. It is the finger-based channel estimation that caused the significant performance loss of the G-rake, as confirmed by Kutz et al. The aforementioned section of Kutz et al. did not disclose any composite CIR-based channel estimation. In fact, the entire paper of Kutz et al. studies the performance degradation due to the finger-based channel estimation in G-rake. Therefore the channel estimation scheme employed by Kutz et al. is the same finger-based estimation scheme employed in G-rake, as is evident in the first and the second paragraphs of section IV in the Kutz reference. Kutz et al. was aware of the shortcomings of finger-based channel estimation, but they did not suggest any new and improved channel estimation scheme, nor did they anticipate using the composite CIR to overcome the shortcomings of finger-based channel estimation. Estimating the composite CIR is entirely foreign to Kutz et al.

The last O.A. also stated that element (b) of claim 17, "estimating a set of noise covariances based on said composite channel impulse responses", was described by Kutz et al. (page 1353, left column, start of section A – right column, 1st 2 lines). The novelty of element (b) in claim 17 is the use of the composite CIR to form the noise covariances. This is the distinctive difference from Kutz et al.: Kutz et al. did not use the composite CIR to estimate the noise covariances, and throughout their paper, including the aforementioned section, the noise covariances are estimated according to the finger-based channel estimation.

The last O.A. also stated that element (c) of claim 17 was described by Kutz et al (page 1354, left column). Element (c), now amended, recites "assigning a set of channel-tap locations by a heuristic search based on said composite channel impulse response". Element (c), when combined with elements (a) and (b), is novel over Kutz et al., since Kutz et al. did not teach or anticipate a

heuristic search based on the composite CIR. In fact, the work of Kutz et al., including their proposed heuristic search, was entirely based on decomposing the channel into multiple fingers, a common practice of all prior arts in CDMA rake and G-rake receivers. As discussed in the specification (pages 2 to 5), and earlier in this amendment, such a practice results in a significant loss in performance, which is overcome by the novel features in the present invention.

The last O.A. also stated that element (d) of claim 17 was described by Kutz et al (page 1353, right column, line 12 – Equation (7)). Element (d), now amended, recites "computing a set of weight coefficients for said set of channel-tap locations based on said composite channel impulse response". Element (d) of claim 17, when combined with elements (a), (b), and (c), is novel. The weight coefficients are computed from the noise variance estimates, which are obtained from the estimate of the composite CIR. The noise covariance matrix in Equation (7) in Kutz et al's paper, on the other hand, was obtained from the estimated fingers, as explained in the first paragraph immediately after Equation (7) in the Kutz reference.

The last O.A. also noted that element (e) of claim 17, "demodulating data in said received signal with said set of channel-tap locations and said set of weight coefficients", was described by Kutz et al (page 1353, section III up to start of section A). Element (e), when combined with elements (a), (b), (c) and (d), is novel. A distinctive difference is that in the present invention, the channel-tap locations and weight coefficients used in data demodulation are obtained from the composite CIR estimate, whereas Kutz used the individually estimated fingers to determine the finger locations, amplitudes and phases for data demodulation, which significantly reduces the quality of the demodulated data.

As discussed earlier, the work of Kutz et al. was limited to the study of the performance degradation of the G-rake due to finger-based channel estimation. They confirmed that the performance loss is significant, but failed to propose any improvements. Applicant performs for the first time the channel-tap selection and weight computation based on estimated composite CIR, which eliminates the performance loss observed by Kutz et al. Use of the composite CIR to overcome the shortcomings of the G-rake is clearly unknown to Kutz et al, and the results from using the composite CIR are new, unexpected, and much improved over Kutz et al.

(2) Dependent claims 18 – 21 are a fortiori patentable over Kutz et al. Claim 18 is dependent of claim 17, and comprises elements (a) and (b). The last O.A. indicated that element (a) of claim 18 was described by Kutz et al (page 1354, left column, lines 5 – 6). Element (a) recites:

> "(a) pre-selecting a first set of channel-tap locations based on said composite channel impulse response".

This is entirely foreign to Kutz et al., since the Kutz et al. simply pre-selected the first L fingers to be the L multipaths of the channel. In other words, the pre-selection by Kutz is entirely based on the estimated individual fingers, and, as established in earlier paragrphs, the use of the composite CIR for pre-selection of the channel taps is novel over Kutz et al.

The last O.A. also noted that element (b) of claim 18 was described by Kutz et al (page 1353). Element (b) recites:

> "(b) selecting a second set of channel-tap locations in said search region by a heuristic search scheme based on said first set of channel-tap locations".

Element (b), when combined with element (a), is novel over Kutz et al., since Kutz et al. lack the feature of the composite CIR. They did not consider nor were they aware of the composite CIR while they performed the finger pre-selection.

Claim 19 is dependent of claim 18. The last O.A. noted that claim 19 was described by Kutz et al (page 1354, 1st 5 lines). Claim 19 recites:

> "The method of claim 18, wherein pre-selecting said first set of channel-tap locations comprises choosing a number of strongest channel taps according to said composite channel impulse response, the distances among which are equal to or larger than a predetermined minimum distance."

Use of the composite CIR is clearly foreign to Kutz et al. Additionally, "choosing a number of strongest channel taps according to said composite channel impulse response" is a different operation than choosing the first several strongest multipaths as Kutz et al did. Since using the composite CIR will capture the channel energy more accurately than simply assigning the L

strongest multipaths to the first L fingers, it represents a new, improved, and unobvious result, and is therefore unobvious.

Claim 20 is also dependent of claim 18. The last O.A. also noted that claim 20 was described by Kutz et al (page 1353, steps in *italics*). The distinctive feature of claim 20 is the rule of the heuristic search. Claim 20 recites the rule to be such that the distance of a selected channel tap to another selected channel tap, or to a pre-selected channel tap, equals to the distance between a pair of pre-selected channel taps. Kutz et al. did not use the rule in claim 20 in their work. Instead, the rule used by Kutz et al. is such that a selected channel tap is the mirror image of a pre-selected channel tap with respect to another pre-selected channel tap, as described by the steps in italics in the Kutz reference. Here an example may help to highlight the difference. Consider a two-path channel with two paths located at 0 and 3. The rule of Kutz et al. would allow only two locations, namely, -3 and 6 (-3 is the mirror image of 3 with respect to 0, and 6 is the mirror image of 0 with respect to 3), for additional fingers. The allowable locations according to the rule in claim 20, on the other hand, are -3, -6, -9, ..., and 6, 9, 12, ..., etc. More allowable channel-tap locations make it more flexible in selecting channel taps, and make the interference cancellation more effective. It is now clear that the rule in claim 20 is more general, and that it includes the rule used by Kutz et al. as a special case. Kutz et al. did not anticipate this novel feature in claim 20, nor were they aware of the advantages afforded by this novel feature.

Claim 21 is also dependent of claim 18. The last O.A. also noted that claim 21 was described by Kutz et al. The distinctive feature of claim 21 is again the rule of the heuristic search. Claim 21 recites the rule to be such that the distance between a selected channel tap and a pre-selected channel tap equals to the distance between a pair of pre-selected channel taps. Kutz et al. did not use, nor did they suggest, the rule in claim 21 in their work. Using the same example in the preceding paragraph, it is clear that the rule in claim 21 is more general, and that it includes the rule used by Kutz et al. as a special case. It is also informative to observe that the rule in claim 21 is a special case of the rule in claim 20.

(3) The novel elements of claims 17 – 21 produce new, improved, and unexpected results and hence unobvious and patentable over the Kutz reference under § 103. The new, improved, and unexpected results are the improved performance and robustness channel estimation.

As discussed in the specification (page 3, last paragraph, extending to page 4), the finger-based channel estimation that G-rake employs is very sensitive to the channel estimation noise, and yields significant performance loss. The work of Kutz et al. also showed the poor performance due to the finger-based channel estimation.

By directly estimating the composite CIR, the present invention avoids decomposing the channel into multipaths, and estimating the channel as such. Directly estimating the composite CIR makes the channel estimation much less susceptible to estimation noise. Using the estimated composite CIR, instead of finger-based channel representation, significantly improves the receiver performance over Kutz et al.

Use of the composite CIR to overcome the shortcomings of the finger-based channel estimation in rake/G-rake receivers was not done before. Therefore neither it nor its concomitant advantages were known or appreciated.

The heuristic search schemes in the present invention are also more generic and flexible than the one described by Kutz et al. The added flexibility helps to further improve the performance.

The novel features that effect the new, improved, and unexpected results are clearly recited in claims 17 – 21.

Thus applicant submits that independent claim 17 clearly recites novel subject matter that distinguish over the Kutz reference, and that dependent claims 18 – 21 incorporate all the subject matter of claim 17 and add additional subject matter that makes them a fortiori and independently patentable over the Kutz reference.

Accordingly applicant submits that the rejections of claims 17 – 21 should be withdrawn.

The Rejections of Claims 1, 3, 5, 7, 9, 10, and 25 Are Overcome

The last O.A. rejected claims 1, 3, 5, 6, 9, 10, 15, and 25 under 35 U.S.C. 103(a) as being unpatentable over Kutz et al. (On the Performance of A Practical Downlink CDMA Generalized Rake Receiver) in view of Wang et al. (US 20010028677). Applicant requests reconsideration of the rejections for the following reasons:

(1) Kutz et al. and Wang et al. fail to render obvious the novel elements in claims 1 and 25. Claim 1 comprises elements (a), (b), (c), (d) and (e). Elements (a), (b), (d), and (e) of claim 1 are identical to elements (a), (b), (d), and (e) of claim 17. By the same analysis presented in previous paragraphs concerning claim 17, it is clear that Kutz et al. did not teach, anticipate, suggest, or render obvious the novel elements in claim 1.

The novel features in claim 1 are entirely foreign both to Kutz et al. and to Wang et al. Neither Kutz et al. nor Wang et al. estimated the composite CIR. Nor did they use the composite CIR to estimate noise variances, to sequentially search the channel-tap locations, and to compute the weight coefficients. Thus even if the system of Kutz and the system of Wang were combined, the combined system would still not meet claim 1. Therefore the novel features in claim 1 are unobvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Wang, in the system of Kutz. It is informative to note the sequence in time of the Kutz reference and the Wang reference. It is the shortcomings of the G-rake, described in the Wang reference, which motivated the Kutz reference. Kutz et al. investigated the performance loss G-rake due to finger-based channel estimation, but did not suggest any improvement. If there were any teaching in the Wang reference to overcome the shortcoming of the G-rake, it would have been noted in the Kutz reference. Thus use of the composite CIR to eliminate the shortcomings of the G-rake is clearly unobvious and unexpected.

Use of the composite CIR not only produced new, unexpected, and superior results, its advantages have also not been appreciated by those skilled in the art. Use of the composite CIR establishes a new principle of operation for receivers in CDMA systems, thus the present invention has blazed a trail, rather than followed one.

Claim 25 is analyzed similarly here to establish its unobviousness and patentability over Kutz et al. and Wang et al.

(2) Dependent claims 3, 5, 7, and 9 comprise novel features not rendered obvious by, and are a fortiori patentable over Kutz et al. and Wang et al. Claim 3 is dependent of claim 1. Claim 3, now amended, recites:

"The method of claim 1, wherein said sequential search comprises:

(a) determining a search region,

(b) pre-selecting a first set of channel-tap locations in said search region based on said composite channel impulse response, if said first set is predetermined to be non-empty, and

(c) sequentially selecting a second set of channel-tap locations in said search region, based on said first set of channel-tap locations, to optimize a design criterion."

Kutz et al. did not determine the search region before they determine the finger locations. Wang et al. did not use the composite CIR to determine the search region. Thus even if the system of Kutz and the system of Wang were combined, the combined system would not meet claim 3.

Claim 5 is dependent of claim 3, and recites that the search region in claim 3 is a union of a set of path regions and a set of mirror image regions. Search region, path region and mirror region are defined in the pages 16 – 17 of the specification. Kutz et al. did not determine the search region before they determine the finger locations. The concepts of the path region and the mirror region are entirely different from the concepts of the path and the mirror of the path. A path region may consist of a plurality of paths, and a mirror region may consist of a plurality of path mirrors. The novel feature of forming the search region by a group of the path regions and the mirror regions can significantly reduce the search size during the sequential search, a new and unexpected result that shows the novel feature is unobvious. There is no sequential search in the system of Kutz, therefore the concept of determining the search region to reduce the search effort is both novel over and foreign to Kutz et al.

Claim 7 is also dependent of claim 3, and recite:

> "The method of claim 3, wherein pre-selecting said first set of channel-tap locations comprises choosing a number of strongest channel taps according to said composite channel impulse response, the distances among which are equal to or larger than a predetermined minimum distance."

The same analysis in the previous paragraphs concerning claim 19 is applied here to establish that claim 7 is novel over Kutz et al., and that Kutz et al. did not render the novel features of claim 7 obvious.

Claim 9 is also dependent of claim 3. Claim 9, now amended, recites:

> "The method of claim 3, wherein said design criterion is signal-to-noise ratio, whereby said signal-to-noise ratio is computed based on said composite channel impulse response."

Use of the composite CIR to compute the SNR is clear foreign to Kutz et al. and Wang et al. Kutz et al. did not use the SNR criterion to determine the finger locations. Instead they determined the finger locations by their heuristic search. Wang et al. did not use the composite CIR to determine the finger locations via the SNR criterion. Thus neither the system of Kutz, nor the system of Wang, meets claim 9, nor does the combined system of Kutz and Wang, if they were combined. Additionally, Kutz immediately dismissed the idea of using SNR to place extra fingers to be "prohibitive complex", and that it "can not be used in real time applications" (Kutz, page 1353, right column, last paragraph, lines 11 – 12). The present invention effectively negates such conclusion of Kutz et al., which is a new and unexpected result.

(3) Dependent claim 10 comprises novel features not rendered obvious by, and are a fortiori patentable over Wang et al. and Kutz et al. Claim 10 is dependent of claim 3, and recites:

> "The method of claim 3, wherein sequentially selecting said second set of channel-tap locations to optimize said design criterion comprises choosing a new channel-tap location that optimizes said design criterion based on a recursive evaluation that explicitly depends on:
>
> (a) a set of previously evaluated functions of all previously chosen channel-tap locations, and
>
> (b) a set of functions of said new channel-tap location, whereby said recursive evaluation can reduce the amount of computations."

The last O.A. interpreted the "previously evaluated functions of all previous chosen channel-tap locations" as the SNR_{max} that was computed in the past iterations, and the "set of functions of said new channel-tap locations" as the new SNR that is computed for this iteration (Wang, Fig. 9; page 8, paragraph 82 – page 9, paragraph 85). Applicant submits that such interpretations are fundamentally misinterpreted. The primary reason is that the concepts of "iteration" in the present invention and in the Wang reference are entirely different. In the Wang reference, an iteration in the context of Fig. 9 is one evaluation of the SNR at a candidate finger location. In the present invention, an iteration is the *selection* of the n-th channel tap given that the n–1 channel taps have been selected. Thus in the present invention, the n-th iteration comprises a plurality of SNR evaluations at a plurality of candidate channel-tap locations in order to select the n-th channel tap. One consequence of this is that an iteration in the present invention may consist of a plurality of steps that would be considered to be "iterations" in the Wang reference.

It is now clear that claim 10 is both novel over and foreign to Kutz et al. and Wang et al. Firstly, in Wang's method, an SNR evaluation at a candidate finger location was performed to decide if a data-combining finger should be placed in that location. Each SNR evaluation requires $O(n^3)$ operations, where there have already been n–1 allocated fingers. In the present invention, the SNR expression is rearranged in the recursive form, consisting of two parts, only one of which depends on the current candidate channel-tap location, as illustrated in Equations (10) and (11) in the specification. As a result, the SNR evaluation now requires only $O(n^2)$ operations if the exact recursive expression is used, and $O(n)$ operations if the approximate recursive expression is used. This greatly reduced complexity is new and unexpected, and the novel features in claim 10 to achieve this are neither anticipated nor performed by Wang et al. Secondly, since Wang et al. did not teach decomposing the SNR expression into the recursive form, which produces the new and unexpected results, it is clearly unobvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Wang, in the system of Kutz, to perform the SNR decomposition, and to use the recursive SNR expression, so that the channel-tap locations are more efficiently determined.

It is worth noting that it is the significant complexity reduction, brought by the novel use of the recursive SNR expression in the present invention, which makes the sequential search feasible.

The novel feature is certainly unknown to Kutz et al., as they stated the sequential search with the SNR criterion to be "prohibitively complex", and "can not be used in real time applications".

Accordingly applicant submits that claims 1 and 25 comply with Section 112, define over the prior art under Section 102, and the claimed distinctions are of patentable merit under Section 103. Applicant also submits that dependent claims 3, 5, 7, 9, and 10 incorporate all the subject matter of claims 1, and adds additional subject matter that makes them a fortiori and independently patentable over the above the references of Kutz et al. and Wang et al. Applicant therefore submits that claims 1, 3, 5, 7, 9, 10, and 25 should be allowed.

The Rejections of Claim 4 Are Overcome

The last O.A. rejected claim 4 under 35 U.S.C. 103(a) as being unpatentable over Kutz et al. (On the Performance of A Practical Downlink CDMA Generalized Rake Receiver) in view of Wang et al. (US 20010028677) and further in view of Bottomley et al. (A Generalized RAKE Receiver For Interference Suppression; IEEE Journal on Selected Areas in Communications; Vol. 18, No. 8; August 2000; pages 1536 – 1545). Applicant requests reconsideration of the rejections for the reasons stated as follows.

Claim 4, now amended, recites:

> "The method of claim 3, wherein said search region is a contiguous region comprising a span of said composite channel impulse response, a pre-composite-channel-impulse-response section, and a post-composite-channel-impulse-response section."

Bottomley et al. did not use the composite CIR to define the search region. As discussed in previous paragraphs, use of the composite CIR yields new, improved, and unexpected results, claim 4 is thus clearly not obvious. Since neither Kutz et al. nor Wang et al. used the composite CIR, it is also clear that claim 4 is unobvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Bottomley, in the combined system of Kutz and Wang.

Thus applicant submits that dependent claim 4 is a fortiori patentable and the rejection should be withdrawn.

The Rejections of Claim 8 Are Overcome

The last O.A. rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Kutz et al. (On the Performance of A Practical Downlink CDMA Generalized Rake Receiver) in view of Wang et al. (US 20010028677) and further in view of Yellin (US 6,618,433). Applicant requests reconsideration of the rejections for the reasons stated as follows.

Claim 8, now amended, recites:

> "The method of claim 3, wherein said design criterion is mean square error, whereby said mean square error is computed based on said composite channel impulse response."

Yellin addressed an entirely different problem, which is multi-user detection (MUD) based on the conventional rake receiver. The mean-square-error (MSE) criterion used by Yellin in MUD is not intended for, nor is it capable of, determining the finger delays of the rake receiver or the G-rake receiver. Additionally, Yellin did not address any of the inherent disadvantages of the conventional rake receiver, let alone the disadvantages of the G-rake receiver that was proposed by Wang et al. Thus those skilled in the art would find it an inoperative combination in the combined system of Kutz, Wang and Yellin.

The fact that claim 8 is unobvious and patentable over these reference is also clear from its use of the composite CIR that yields new, improved, and unexpected results.

Thus applicant submits that dependent claim 8 is a fortiori patentable and should be allowed.

The Rejections of Claims 16, 23, and 26 Are Overcome

The last O.A. rejected claims 16, 23, and 26 under 35 U.S.C. 103(a) as being unpatentable over Kutz et al. (On the Performance of A Practical Downlink CDMA Generalized Rake Receiver) in view of Wang et al. (US 20010028677) and further in view of Dabak et al (US 6,345,069). Applicant requests reconsideration of the rejections for the reasons stated as follows.

Claim 16, now amended, recites:

> "The method of claim 1, wherein recovering data in said received signal sent in said communications media is performed at 2× oversampling."

Dabak et al. addressed an entirely different problem, namely, cell search in the CDMA systems. Cell search is not intended for, nor is it capable of, recovering data from the received signal, which is the primary application of claim 16. Thus those skilled in the art will find that it is impossible to combine the system of Dabak et al. with the combined system of Kutz and Wang for the purpose of recovering data from the received signal. Such a combination is also unsuggested – none of the above references contain any suggestions that they be combined in the manner suggested in the last O.A.

Use of 2× oversampling also achieves new, superior, and unexpected results. All prior-art with respect of conventional rake receivers and G-rake receivers used more than 2× oversampling, typically at 4× or 8×. The reason for the much higher sample rate in rake/G-rake receivers, as stated in the specification (page 3, item 5), is that operations of those receivers are based on resolvable fingers, where higher sample rate is needed to align the finger peak with discrete signal samples. The operations of the present invention are based on the composite CIR, which removes the dependence on the resolvable multipaths, and the optimum performance is achieved with 2× oversampling, making it unnecessary to use higher sample rate. The advantages of 2× oversampling include reduced requirements on the analog-to-digital convertor (ADC), reduced circuit size, and the power consumption of the ADC and the front-end filter. If the system of Dabak and the combined system of Kutz and Wang were to be combined, even the cell search can be performed at 2× oversampling, as taught by Dabak et al., the operation of recovering data from the received signal in the G-rake would still have to use more than 2× oversampling, since use of 2× oversampling would further degrade the performance of the G-rake in the combined system of Kutz and Wang.

The above analysis is also applied to claims 23 and 26.

Accordingly applicant submits that dependent claims 16, 23, 26 incorporate all the subject matter of claims 1, 17, and 26, respectively, and add additional subject matter that makes them a fortiori and independently patentable over the above references, and therefore these claims should be allowed.

Allowable Subject Matter

Applicant acknowledges with appreciation that the last O.A. allowed claims 2, 11 – 14 if rewritten in independent form. Applicant submits that since objections to independent claim 1 are overcome, claims 2, 11 – 14 should be allowed as dependent claims.

Other References in the Last O.A.

The last O.A. also cited the following three references: Bottomley (US 5,506,861), Dent et al. (US 5,572,552), Bottomley (US 6,363,104), and Shelm et al. (US 20030235238). Applicant has reviewed these references in good faith and has found that they do not show this application or render it obvious.

Conclusion

For all the reasons given above, applicant respectfully submits that the errors in the specification are corrected, the claims comply with Section 112, the claims define over the prior art under Section 102, and the claimed distinctions are of patentable merit under Section 103 because of the new results provided. Therefore applicant submits that this application is now in full condition for allowance, which action applicant respectfully solicits.

Very respectfully,

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Certificate of Facsimile Transmission. I certify that on the date below I will fax this communication to GAU 2611 of the Patent and Trademark Office at 571-273-8300.

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